

# THE MINERAL INDUSTRIES OF CENTRAL AMERICA

## BELIZE, COSTA RICA, EL SALVADOR, GUATEMALA, HONDURAS, NICARAGUA, AND PANAMA

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The Central America region of the western hemisphere is made up of the long tapering isthmus that forms a bridge between North America and South America. It has an area of about 524,000 square kilometers (km<sup>2</sup>) and comprises the countries of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. In 2002, the region had a population of 37.6 million and an annual growth rate of about 2.8%. The region's combined gross domestic product (GDP) was estimated to be \$74.4 billion at purchasing power parity, and the weighted average per capita GDP was estimated to be \$1,972 (U.S. Energy Information Administration, 2003<sup>1</sup>).

Central America's economy was based primarily on agriculture and manufacturing, which, for the most part, involved the processing of raw materials. Farming was by far the leading economic activity in Central America. The principal cash crops, such as bananas, coffee, cotton, and sugar cane, were typically produced on large land holdings, and a substantial proportion was exported, mainly to the United States and Europe. The region's small but diverse mining operations produced a variety of metals, industrial minerals, and mineral fuels. The metals sector continued to be limited to the mining of antimony, gold, iron ore, lead, silver, and zinc and the production of steel. Gold mining was centered primarily in Costa Rica, Guatemala, Honduras, Nicaragua, and Panama. Industrial minerals production included cement, gypsum, limestone, marble, pumice, salt, and sand and gravel.

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## BELIZE

Belize has been an independent member of the British Commonwealth since 1981. Its economic performance is highly susceptible to external commodity market changes. Belize borders the Caribbean Sea between Guatemala and Mexico. It has an area of 22,966 km<sup>2</sup> and had an estimated population of 266,440 as of July 2003. The country's GDP growth was 3.7% higher than that of the previous years. In 2002, the nation's estimated GDP at purchasing power parity was \$1.28 billion, and its per capita GDP was estimated to be \$4,900 (U.S. Central Intelligence Agency, 2003<sup>§</sup>).

The Ministry of Natural Resources is responsible for the administration of the mining sector in Belize. The Mines and Minerals Act of 1998, which covers all mining operations in Belize, regulates mining activities. The Fiscal Incentive Package for Mining allows investors quick recovery of their investments; this program covers mines or quarries that have been shut down. The ad valorem tax was 3% on industrial and construction mineral production and 5% on all precious- and semiprecious-metal production. It also provides for losses to be carried forward for 7 years after which only the amount that reduces the profit in that year to one-half of its value can be allowed. The act also provides for exemption from payment of custom duty for mining equipment and supplies. Petroleum was not covered by the Act.

Clays, dolomite, lime, limestone, marble, and sand and gravel for construction and civil works were the mainstay of Belize's mineral production. A very small yearly amount of gold was produced by stream panning. No mineral commodities were known to have been exported. The country was dependent on imports for its fuel and mineral requirements. Belize Electricity Limited was the main generator, distributor, and transmitter of electricity in the country. BEL received about 85% of its electricity from Belize Electricity Company Ltd. (BECOL) and the Comisión Federal de Electricidad of Mexico to meet domestic demand. BECOL owned and operated the 25-megawatt Mollejon Dam, which was the only dam in operation during 2003. The rest of the country's electricity was from diesel-powered thermal plants (U.S. Energy Information Administration, 2003<sup>§</sup>).

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## COSTA RICA

Costa Rica, which is located in the middle of Central America, borders the Caribbean Sea and the Pacific Ocean between Nicaragua and Panama. It has an area of 51,100 km<sup>2</sup> and had a population of approximately 3.9 million as of July 2003. Although still mostly an

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<sup>1</sup>References that include a section mark (§) are found in the Internet Reference(s) Cited sections.

agricultural country, it has expanded its economy to include strong technology and tourism sectors, which has allowed the Costa Ricans a relatively high standard of living compared with that of the residents in the other countries of Central America. The country's political stability and high education levels attracted foreign investors. Costa Rica's GDP at purchasing power parity was estimated to be \$32 billion for 2002, and its per capita GDP was estimated to be \$8,300. The GDP composition by sectors was services, 61%, industry, 30%, and agriculture, 9%. Traditional merchandise exports (predominantly agricultural) amounted to \$5.1 billion, and total imports were valued at \$6.4 billion. Europe and the United States remained the major export and import partners (U.S. Central Intelligence Agency, 2003\$).

Costa Rica was a net energy importer. The main import was oil. Hydroelectric plants generated about 90% of the country's electricity, and the nation's electricity sector was dominated by the state-owned electricity monopoly Instituto Costarricense de Electricidad, which supplied almost 100% of the country's electricity needs in 2003. Costa Rica estimated that electricity demand will grow by about 6.0% per year through 2020 and will require an investment of about \$3 billion by 2011 (U.S. Energy Information Administration, 2003\$).

Under the terms of an exploration and production concession contract, Global Energy Development Ltd., through an investment in Harken Costa Rica Holdings LLC, owned an interest in approximately 1.4 million acres in the North Limon and the South Limon back arc basins onshore and offshore Costa Rica (Harken Energy Corporation, 2004, p. 11).

In May 2002 in response to lobbying from the country's environmentalists and other foreign nongovernmental organizations, the president of Costa Rica issued a presidential decree that put a moratorium on oil exploration, open pit mining, and cyanide processing. If this moratorium delays open pit mining and cyanide processing, then the gold-mining industry would be directly and severely affected. Although this moratorium officially applied only to new projects, not to existing projects that had already been approved prior to May 2002, such as the Bellavista, or to projects that were already in the process of approval, such as the Cerro Crucitas, the decree was still indicative of a more-restrictive legal environment for mining in Costa Rica. Failure to comply strictly with applicable laws, regulations, and local practices that related to mineral rights applications and tenure could result in loss, reduction, or expropriation of entitlements or the imposition of additional local or foreign parties as joint-venture partners.

In spite of this negative backdrop, the Bellavista Project, which was dormant for most of the year because of the gold price, underwent a change of ownership (Seaward and Coates, 2003). In November, Wheaton River Minerals Ltd. sold the Bellavista property to Glencairn Gold Corporation. A feasibility study by Wheaton River indicated a \$28 million capital cost would be required to develop an operation to produce an average of 1,866 kilograms per year (kg/yr) (60,000 troy ounces per year) of gold during about a 7.5-year mine life with total cash operating costs, which included royalties, of \$179 per troy ounce. According to the study, a gold price of \$325 per troy ounce would produce a pretax internal rate of return of 19%, and \$350 per troy ounce, 33.2%. Glencairn acquired the Bellavista Project, which was fully permitted with a bankable feasibility study, for less than \$1 per troy ounce. A permit was finally granted in 2001. Exempted from the 2002 moratorium on new open pit mining permits, construction at Bellavista began in late 2003. Capital costs for the open pit heap-leach operation was \$26 million; Glencairn expected to produce an average of 1,866 kg/yr (60,000 troy ounces per year) of gold at a cash cost of \$163 per troy ounce during the mine's life starting in 2004 (Heffernan, 2004\$).

Vannessa Ventures Ltd. of Calgary, Alberta, Canada, owned the Cerro Crucitas gold project, which was expected to be a bulk-tonnage, multimillion-ounce gold deposit. Placer Dome Inc. formerly owned Cerro Crucitas and invested more than \$32 million on exploration and development. In January 2002, Vannessa obtained an exploitation permit from the Government of Costa Rica, and the required environmental impact study (EIS) was submitted to the Secretaría Técnica Nacional Ambiental (SETENA) in March 2002. Following a 1-year review period and coincident with the Government moratorium on open pit mining, SETENA denied the EIS for Cerro Crucitas. Subsequently, the Ministerio de Ambiente y Energía, which was ultimately responsible for approval of the licence, overruled SETENA and reinstated the application process. The company notified the Canadian and the Costa Rican Governments that it will continue with the arbitration process under the Financial Investment Protection Agreement signed between the two countries (Seaward and Coates, 2003).

The Cerro Crucitas deposit comprises a gold-bearing saprolite (weather-oxidized soil) and gold-bearing hard-rock resource. The most recent independent estimate of the entire deposit was completed in May 1999 by Independent Mining Consultants Inc., which calculated a total measured and indicated gold resource of 44,789 kilograms (kg) (1.44 million troy ounces) that consisted of 29.6 million metric tons (Mt) of ore at average grades of 1.51 grams per metric ton (g/t) gold and 3.41 g/t silver based on a 0.8 g/t gold cut-off grade. Inferred resources are 10.1 Mt of ore at average grades of 1.56 g/t gold and 2.93 g/t silver. Additional inferred resources at the nearby Conchudita concession were 3.2 Mt of ore at an average grade of 4.56 g/t gold. The combined resource estimate of 73,715 kg (2.37 million troy ounces) of contained gold was based on exploration and development work completed by Vannessa and previous owners (Seaward and Coates, 2003).

Only the engineering and construction division of the Techint Group of Argentina presented a bid for \$79.5 million to Costa Rica's state-owned refinery Refinadora Costarricense de Petróleo S.A. for a contract to build a 12-inch-diameter multiproduct pipeline from the Port of Moin to La Garita. The deadline to receive bids was March 12, 2004 (Rigzone.com, 2004\$).

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## EL SALVADOR

El Salvador, which is located in the middle of Central America, borders the North Pacific Ocean between Guatemala and Honduras. It has an area of 21,040 km<sup>2</sup> and had a population of approximately 6.5 million in 2003. El Salvador adopted stable policies to strengthen public banks and financial supervision, to expand the role of the private sector, and to pursue further trade integration. Economic shocks, which included the earthquakes in 2001, adverse terms-of-trade developments (coffee and oil), and a global economy slowdown, have slowed economic growth nonetheless. Total exports have grown to an estimated \$3.29 billion in 2003 from \$2.6 billion in 2001. The GDP was estimated to be about \$29.4 billion, and the per capita GDP was estimated to be \$4,600. The economy depended on services (about 60% of the GDP), industry (about 30%), and agriculture (about 10%). In 2002, the real GDP growth rate was 1.4%. Major export trading partners remained the United States (63.3%), Guatemala (12%), Honduras (6.8%), and Nicaragua (4.5%). Annual inflation was estimated to be 3.8% in 2003 (U.S. Central Intelligence Agency, 2003§).

El Salvador continued to maintain a high economic status relative to other countries in Central America. The economy was polarized, and annual inflation was maintained at less than 2% in 2001 and 2002 after the U.S. dollar was introduced as legal tender in January 2001. Recent progressive revisions to the Mining Code have encouraged investment in the country, although exploration is still restricted to a few mining companies (Curtis, 2003). Besides cement and limestone, El Salvador produced aluminum metal, fertilizer, gypsum, salt, and steel semimanufactures.

Pacific Rim Mining Corp. of Canada operated El Dorado and La Calera gold exploration projects in 2003 (Curtis, 2003). On November 26, 2003, Pacific Rim published an updated resource estimate for the Minita resource area at El Dorado Project. The measured and indicated resources in the Minita vein where most of the defined resources occur were about 1.6 Mt of ore at average grades of 11.38 g/t gold and 70.3 g/t silver for a total of 18,202 kg (585,200 troy ounces) of gold and 111,973 kg (3.6 million troy ounces) of silver; this was a 67% increase over the previous resource estimate for the Minita vein. In addition, the near-surface Nueva Esperanza (measured and indicated resources of about 1.1 Mt with grades of 2.3 g/t gold and 14.2 g/t silver) and the Coyotera [measured and indicated resources of 535,000 metric tons (t) with grades of 9.07 g/t gold and 70.7 g/t silver] deposits added to the measured and indicated resource at El Dorado, which totaled 25,536 kg (821,000 troy ounces) of gold and 164,849 kg (5.3 million troy ounces) of silver (Pacific Rim Mining Corp., 2003, p. 5). In early 2003, exploration drilling began at La Calera gold project, which is located 8 kilometers (km) west of the company's cornerstone El Dorado gold project. La Calera Project is an epithermal vein system. Pacific Rim acquired La Calera because of the encouraging results of surface samples of exposed quartz-calcite veins that comprise the epithermal system identified on this project by previous owners (Curtis, 2003).

Triada S.A. de C.V. (a wholly owned subsidiary of Intrepid Minerals Corporation of Canada) was granted an exploration license for Cerro Petancol in central El Salvador. The Cerro Petancol gold-silver prospect covered 49.5 km<sup>2</sup> of mid-Tertiary-aged volcanic rocks that have extensive areas of hydrothermal alteration (Intrepid Minerals Corporation, 2003§).

Intrepid Minerals completed a 2,800-meter (m) drilling program on its Aldea Zapote silver property in Metapan. The program was a joint venture between Intrepid Minerals (the operator) and Apex Silver Mines Ltd. of Canada and was earning a 60% interest. In eastern El Salvador, Intrepid began a 5,000-m drilling program on its 100% owned San Cristobal property. Several bulk tonnage gold-silver targets centered on the former Encuentros and Montecristo Mines were being tested in this program. In addition, Intrepid Minerals had a joint venture with Bema Gold Corporation that could earn a 60% interest in the former Divisadero Mine area by expending \$2 million during 3 years on the project. The target was a high-grade gold-silver epithermal system that had been mined to a depth of 80 m (Curtis, 2003).

Cementos de El Salvador S.A. (CESSA) was fully integrated and remained the principal producer of cement in the country. It sourced limestone in Metapan for its expanded 2,500-metric-ton-per-day (t/d) cement plant. CESSA distributed cement throughout El Salvador and shipped it to neighboring Guatemala and Honduras.

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## GUATEMALA

Guatemala, which is located in the middle of Central America, borders the Caribbean Sea between Honduras and Belize and borders the Pacific Ocean between El Salvador and Mexico. It has an area of 108,890 km<sup>2</sup> and had an estimated population of 13.9 million. In 2002, the GDP at purchasing power parity was estimated to be \$53.2 billion, the GDP growth rate was 2.2%, and the per capita GDP was about \$3,900 (U.S. Central Intelligence Agency, 2003§).

Guatemala has a diverse regional geology and the largest economy in the region, but it still faced numerous economic and social challenges as a result of a civil war that ended in 1997. Central America's worst drought in 10 years affected Guatemala's agricultural production to a greater extent than neighboring countries. In 2002, the International Monetary Fund (IMF) approved a program for financial sector reform. The Government has tried to reduce the fiscal deficit and to encourage privatization. The Government sector is small and shrinking; some public utilities have been privatized, as have ports, airports, and several development-oriented financial institutions.

Guatemala's mineral production included small amounts of antimony, gold, silver, copper iron ore, lead, zinc, and industrial minerals. The approval of the Mining Code (Decree No. 48-97) has helped to promote exploration activity by providing additional incentives to potential domestic and foreign investors.

Chesbar Resources Inc. and its joint-venture partner in Guatemala Intrepid Minerals have control of six exploration licenses that cover some 250 km<sup>2</sup> owned by Minera Mayamerica S.A. in which Chesbar Resources earned a 70% interest. Work was concentrated on two nickel laterite properties at Marichaj and Sechol. In early 2003, the exploration program identified a new lateritic nickel target within the mineralized zone of the 15-km<sup>2</sup> Sechol property. Measured resources were reported to be 14 Mt at average grades of 1.36% nickel and 0.08% cobalt; indicated resources, 23 Mt at average grades of 1.4% nickel and 0.08% cobalt; and inferred resources, 133 Mt at an average grade of 1.51% nickel (Harben and Harris, 2003).

Radius Explorations Ltd. of Vancouver, British Columbia, Canada, acquired full ownership of the Tambor gold property in central Guatemala from Gold Fields Ltd. of South Africa. Previously, Gold Fields and Radius shared the properties on a 55%-45% basis. The joint venture, which had been formed in 2001, was designed to explore a 25-km stretch on the southern side of the Motagua fault zone. Gold Fields, as operator, advanced the project by increasing the land position and making several discoveries. The Tambor properties host a lode belt with a heap-leachable resource of 1,798 kg (57,800 troy ounces) of gold (indicated) and 6,718 kg (216,000 troy ounces) (inferred) at a cutoff grade of 3 g/t gold. Drilling was expected to expand the resource (Northern Miner, The, 2004).

Radius merged with PilaGold Inc. in early March 2003 to explore for gold in Central America. PilaGold and Radius continued the second phase of diamond drilling at the Banderas Project in eastern Guatemala. The full results of the Phases 1 and 2 drill programs were being compiled. The drilling completed to date demonstrated that a substantial strike length of a mineralized vein system exists at Banderas. PilaGold can earn a 60% interest in the Banderas Project by spending \$4 million in exploration on the Project during a 3-year period starting in early 2004 (Radius Exploration Ltd., 2004§).

Glamis Gold Ltd., which was headquartered in Reno, Nevada, reported a new mineral-resource estimate at its Marlin property of more than 124,000 kg (4.0 million troy ounces) of gold equivalent, which was a 24% increase over the 103,000 kg (3.3 million troy ounces) of silver equivalent resource announced in November 2002. The Marlin Project is located in the western highlands of Guatemala 48 km southwest of Huehuetenango. Glamis approved the updated Marlin feasibility study in November 2003. This study incorporated ongoing exploration results that increased proven and probable reserves by 40% to 68,428 kg (2.2 million troy ounces) of gold and 1.06 million kilograms (34 million troy ounces) of silver. By yearend, the Guatemalan Government granted key environmental permits and the exploitation license, which allowed development and mining to proceed. Construction will begin in the first quarter of 2004. The Marlin Project will be developed as a combination open pit and underground mine. Annual production was expected to average 6,750 kg (217,000 troy ounces) of gold and 102,642 kg (3.3 million troy ounces) of silver during a 10-year mine life (Glamis Gold Ltd., 2004, p. 11).

Output by the industrial minerals sector differs greatly from year to year. Industrial minerals, such as barite, clays, feldspar, gypsum, limestone, salt, sand (including silica sand) and gravel, and talc, were produced chiefly for domestic use. Marble from white through green was exported abroad especially to Colombia. Andesite, ash, basalt, or pumice and volcanic sand were used for agricultural, construction, and industrial applications. Jade was found in a mountainous region of Guatemala after Hurricane Mitch hit the country in 1998 and exposed veins of jade, which included large outcroppings of blue jade. National cement consumption tended to exceed local supply with imports of up to 40,000 t/yr. Cementos Progreso S.A. had two plants and a 1.4-million-metric-ton-per-year capacity; expansions at its San Miguel plant helped increase production (Harben and Harris, 2003).

A subsidiary of Perenco Exploration Ltd. was the largest oil producer and operated a minirefinery (2,000 barrels per day) in the Peten Basin. Texaco Inc. operated the Escuintla refinery and gasoline stations and had a large downstream presence. Nevertheless, national oil consumption exceeded domestic production and refining capacity. Consequently, Guatemala was a net importer of petroleum and received a share of reduced-price oil from Mexico and Venezuela as part of the San Jose Pact. The Caracas Energy Accord signed in October 2000 provided additional reduced-price oil from Venezuela (Harben and Harris, 2003).

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## HONDURAS

Located in the middle of Central America, Honduras borders the Caribbean Sea between Guatemala and Nicaragua and the Pacific Ocean between El Salvador and Nicaragua. In 2003, the Honduran economy grew by 2.5%, and the GDP was estimated to be \$16.3 billion; the per capita GDP at purchasing power parity was about \$2,500 (2002 estimate). Honduras had an estimated population of 6.7 million. Overall, economic growth remained dependent on the status of the U.S. economy; the United States was its major trading partner. As reconstruction from Hurricane Mitch (1998) was completed, Honduras, which was one of the poorest countries in the Western Hemisphere, anticipated additional economic assistance under the United States' Enhanced Caribbean Basin Initiative and debt relief under the World Bank Group's Initiative for Heavily Indebted Poor Countries. Although the country met most of its macroeconomic targets, it failed to meet the IMF's goal to liberalize its energy and telecommunications sectors (U.S. Central Intelligence Agency, 2003§).

Mineral production in the country included minor amounts of cadmium, gold, iron oxide, lead, limestone, marble, pumice, rhyolite, salt, silver, and zinc. The Dirección Ejecutiva de Fomento a la Minería is responsible for the administration of the mining sector.

Breakwater Resources Ltd. continued exploration at its El Mochito Mine. Exploration during 2003 focused on extension/expansion of existing zones in the mine, new zones in the mine, and surface exploration on new and unexplored areas of the mine property. Zinc-lead-silver mineralization at El Mochito occurs in sedimentary rocks of Cretaceous age and belongs to the economically important class of high-temperature zinc-lead carbonate replacement deposits. Mineralization at El Mochito occurs in chimneys and mantos. The mine produced 50,962 kg of silver, 43,766 t of zinc, and 9,014 t of lead in 2003 compared with 52,877 kg of silver, 46,339 t of zinc, and 8,128 t of lead in 2002. The decrease in cash costs to \$0.29 per pound of zinc from \$0.32 per pound was attributable to lower zinc concentrate production, which was the result of lower grade mill-feed zinc. El Mochito is located near Las Vegas some 88 km southeast of San Pedro Sula in northwestern Honduras. The underground operation included a 2,000-t/d concentrator that produced separate lead and zinc concentrates. At the end of December 2002, El Mochito's proven and probable reserves totaled 3.2 Mt with average grades of 6.6% zinc, 1.8% lead, and 76 g/t silver; this was an increase of 18% compared with that at yearend 2001. El Mochito's estimated measured and indicated reserves were 4.3 Mt (down by 28%) with average grades of 8.2% zinc, 2.5% lead, and 99 g/t silver. The inferred reserves were 2.4 Mt with average grades of 7.4% zinc, 3.2% lead, and 110 g/t silver (Breakwater Resources Ltd., 2003).

In 2003, production at Glamis' San Martin Mine was 3,167 kg (101,835 troy ounces) of gold at a total cash cost of \$175 per ounce. Production during the year was below expectations because the mine experienced delays in gold recoveries owing to leach-pad-solution issues that persisted into the third quarter of the year. These issues were successfully resolved in the final quarter of 2003. Gold production at San Martin was forecast to exceed 3,100 kg/yr (100,000 troy ounces per year) again in 2004 but is expected to decline gradually, first to about 2,800 kg/yr (90,000 troy ounces per year) and then to about 2,500 kg/yr (80,000 troy ounces per year) during the remainder of the 6-year mine life with a corresponding increase in total cash costs. Glamis continued its exploration program around the mine site and filed for permits to begin drilling at the nearby Minitas property (Glamis Gold Ltd., 2004, p. 6).

Centram Exploration Ltd. of Vancouver, British Columbia, Canada, held a 100% interest in El Triunfo copper-gold concession. In fiscal year 2000, the company entered into an agreement with Compania Minera Rio Quinto B.V. (a subsidiary of Billiton plc) in which it could earn a 51% interest in the concession by incurring \$2,250,000 in exploration expenditures by January 25, 2004. During fiscal year 2001, Billiton advanced Centram a total of \$304,386, of which \$179,841 was expected in fiscal year 2001; the remaining \$124,545 was expended in fiscal year 2002. In February 2002, Billiton withdrew from the option agreement (Centram Exploration Ltd., 2003).

First Point Minerals Corp. of Canada continued exploration drilling at the Cacamuya gold silver property in Honduras. Exploration at Cacamuya has improved the understanding of the controls of gold mineralization on the property. Although Cerro Chachagua and Filo Lapa and their extensions were primary exploration targets, the Cerro Chachagua veins are important as a target because they indicate potential for similar higher grades below the Filo Lapa showing (First Point Minerals Corp., 2003§).

At Filo Lapa, rock channel samples from hand trenches in an area from 10 to 50 m wide and 250 m long averaged 0.75 g/t gold and 25 g/t silver. The zone remains open to the northeast where additional trenching, mapping, and sampling were planned prior to drill testing. Deeper seated high-grade epithermal vein mineralization at the Cerro Chachagua and related targets occur about 2 km east of Filo Lapa at a topographically and stratigraphically lower position. These targets are classic bonanza epithermal veins similar to Meridian Gold Inc.'s El Penon gold mine in Chile (First Point Minerals Corp., 2003§).

Honduras also produced a number of industrial minerals that included gypsum and marble, which were mostly for export, and salt from the Choluteca District. Local limestone was used by Cementos del Norte S.A. de C.V. and Industria Cementera Hondureña S.A. de C.V. (Incehsa), which had clinker capacities of 600,000 t/yr and 450,000 t/yr, respectively; the Lafarge Group of France had a majority stake in Incehsa. Incehsa proposed to expand its clinker capacity to 657,000 t/yr (International Cement Review, 2003).

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## NICARAGUA

Located in the middle of Central America, Nicaragua borders the Caribbean Sea and the Pacific Ocean between Costa Rica and Honduras. In 2003, the Nicaraguan economy grew by 1.1% with an estimated GDP at purchasing power parity of about \$11.2 billion, and a GDP per capita of about \$2,200. Nicaragua had an estimated population of about 5.1 million in 2003. Overall, continued economic growth was expected because Nicaragua met all the conditions for additional debt service relief in December 2000 (U.S. Central Intelligence Agency, 2003§).

Corporación Nicaraguense de Minas was responsible for the administration of the mining sector. Nicaragua was a producer of gold and silver and industrial minerals. In 2002, it produced some 3,903 kg (120,400 troy ounces) of gold compared with 3,745 kg (120,400 troy ounces) of gold produced in 2001 and 2,199 kg (70,700 troy ounces) of silver compared with approximately 2,500 kg (80,000 troy ounces) produced in 2001 (Bowyer, 2003).

Glencairn reported that for the year ended December 31, 2003, sales increased by 8% to \$16.2 million compared with \$14.9 million in 2002; earnings from mining operations rose to \$2.4 million compared with a loss of \$366,000 in 2002; net loss declined to \$1.6 million from \$3.3 million in 2002; working capital at yearend was \$19.7 million, which was up from \$3.9 million a year earlier; and the value of total assets more than doubled to \$38.5 million. These are the first financial results of the joint venture of Glencairn with Black Hawk Mining Inc. that was completed in late 2003. Under generally accepted accounting principles in Canada, the Black Hawk financial statements form the basis of the Glencairn financial statements. Comparative amounts for 2002 were from the former Black Hawk financial statements. Through the combination with Black Hawk, Glencairn acquired the Limon Mine, a large area of exploration properties in Nicaragua, and other exploration projects in Canada. The Limon Mine was Glencairn's only operating mine during 2003, and all sales and cost of sales relate to that mine. Gold sales included about 604 kg (19,430 troy ounces) in 2003 compared with about 1,550 kg (49,920 troy ounces) in 2002, which was delivered under those hedge agreements. Gold production was about 347 kg (11,156 troy ounces) lower, or about 20% less in 2003 than in 2002, owing to lower head grades and the effects of the strike at the Limon Mine that began in October 2002 and was settled in February 2003. Operations at El Limon did not return to full production until the second quarter of 2003. Total cash costs per ounce in 2003 increased by 18% to \$267 owing to the lower production (Glencairn Gold Corporation, 2004§).

Diadem Resources Ltd. of Toronto, Ontario, Canada, had a potential interest in La Mestiza gold deposit. The deposit's five veins have been investigated by trenching, shafts, and adits. Diadem Resources estimated measured resources of 157,470 t at a grade of 10.63 g/t gold, indicated resources of 1.5 Mt at a grade of 9.3 g/t, and inferred resources of some 3.5 Mt at La Mestiza. Diadem's interest will be 68.25% when production is achieved. Operating cost per troy ounce was estimated to be between \$150 and \$175 (Bowyer, 2003).

In 2003, Holcim de Nicaragua S.A. operated one grinding station and employed 80 people. Its cement production capacity was about 300,000 t/yr (Holcim Ltd., 2004, p. 136). CEMEX S.A. de C.V. started operations in Nicaragua through a 25-year agreement signed with the Nicaraguan Government under which the company operated the local cement plant Compañía Nacional Productora de Cemento S.A., which had a production capacity of 450,000 t/yr. The plant was located 45 km from the capital of Managua. In its first year of operation in Nicaragua, CEMEX managed to decrease variable costs by 18%, to reduce management expenses by 45%, and to increase sales by 63% (CEMEX S.A. de C.V., 2003§).

Nicaragua has deposits of industrial minerals, which include calcium, bentonite, dimension stone, gypsum, kaolin, limestone, pumice, and zeolite. Nicaragua relied on imports for mineral fuels, especially crude oil from Venezuela. Esso Standard Oil S.A. Ltd. of Nicaragua supplied most of the country's oil needs.

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## PANAMA

Panama, which is located in the middle of Central America, borders the Caribbean Sea and the Pacific Ocean between Colombia and Costa Rica; the area is 78,200 km<sup>2</sup>. In 2003, the Panamanian economy grew by about 0.7%. The estimated GDP at purchasing power parity was about \$18.1 billion, and the GDP per capita was about \$6,200. The population was estimated to be about 3 million in 2003. The economy was based primarily on a well developed services sector that accounted for three-fourths of the GDP. Services included the operation of the Panama Canal, the Colon duty-free zone, international banking and insurance services, the Panama Canal ship registry, and tourism. Industries, which included brewing, cement and other construction materials, construction, petroleum refining, and sugar milling, accounted for about 17% of the GDP (U.S. Central Intelligence Agency, 2003§).

Recently, significant exploration activity in Panama, mainly by Canadian mining companies, has involved Adrian Resources Ltd., Aur Resources Inc., Campbell Resources Inc., Glamis Gold, Greenstone Resources Ltd., Inmet Mining Corporation, International Arlo Resources Ltd., Laguna Gold Co., Teck Cominco Limited, and Tiomin Resources Inc. Activities included detailed exploration, feasibility studies, prefeasibility studies, and reconnaissance. A new mining code was being prepared (Ellis, 2003). Panama's Dirección General de Recursos Minerales was awaiting recommendations from mining consultants in preparation for the first draft of a new mining code. Taxation is likely to be an issue. Existing legislation provides for surface land taxes, which depend on the type of mineral, and for royalties for metals. Also, the current mining code includes no obligation for a mining company to lodge a bond with the state concerning mine closure (Mining Journal, 2003).

In Cerro Colorado and Cerro Petaquilla, Panama possesses two of the world's larger undeveloped porphyry copper deposits. In February 2001, Tiomin Resources transferred ownership of its wholly owned subsidiary PanaCobre S.A. to Aur Resources to repay a \$2.3 million loan made by Aur to Tiomin. PanaCobre owned the Cerro Colorado copper project, which has been dormant since 1998. PanaCobre had evaluated the oxide and sulfide reserves, and feasibility studies established a sulfide reserve of 1,750 Mt at an average grade of 0.64% copper (Ellis, 2003).

Empresa Minera Petaquilla S.A. was owned by Adrian Resources (52%) and Inmet Mining (48%). Its Petaquilla property was estimated to contain some 30 Mt of copper. Teck Cominco can earn a 26% interest in the project from Adrian Resources by funding a feasibility study and carrying Adrian Resource's remaining 26% interest to production (Ellis, 2003).

During 2003, RNC Gold Inc. finalized an agreement to purchase 50% of the Cerro Quema gold-silver project in Panama; this will raise the company's interest to 60%. RNC will earn the remaining 40% of Cerro Quema at no additional cost upon initiation of production in 2005. At Cerro Quema, RNC expected to build a \$14 million open pit heap-leach mine; construction will begin in late 2004. Production will start in late 2005 with production estimated to be 1,493 kg/yr (48,000 troy ounces per year) of gold (RNC Gold Inc., 2004§).

Panama produced small quantities of cement, clays, gold, lime, limestone, marine salt, and sand and gravel. Empresa Estatal de Cementos Bayano at Calzada Larga and Cementos de Panama S.A. at Quebrancha were the principal cement producers. Cementos Bayano sold its 95% to CEMEX. A 5% share was sold to employees as part of the country's new pension plan (Ellis, 2003). Cementos Panama was a subsidiary of Corporación Incem S.A., which was owned by CEMEX. Cementos Panama had an annual production capacity of about 800,000 t of cement. Incem ran several concrete mixing plants in Colon and Panama City and some concrete element manufacturing facilities.

Panama has no oil and gas reserves. All oil was imported from Ecuador, Mexico, Saudi Arabia, and Venezuela. The country neither produced nor consumed natural gas. Houston, Texas-based Global Energy Development Inc., of which Harken Energy Corporation owned a majority interest, offered a farm-out of its Garachine block in which the company had a 2-year technical evaluation agreement with the Panamanian Government. The block covers 5,670 km<sup>2</sup> onshore and offshore in the eastern Gulf of Panama. The contract with Harken was the first petroleum exploration permit granted by Panama since 1987 and granted the right to studies in the Provinces of Bocas del Toro, Colon, and Panama (Ellis, 2003).

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U.S. Central Intelligence Agency, 2003, Panama, World Factbook 2003, accessed February 6, 2003, at URL <http://www.cia.gov/cia/publications/factbook/geos/pn.html>.

## Major Sources of Information

### Belize

Geology and Petroleum Office  
Ministry of Natural Resources  
84-36 Unity Blvd.  
Belmopan, Belize

### Costa Rica

Ministerio de Recursos Naturales, Energía y Minas  
Dirección de Geología, Minas e Hidrocarburos  
Apartado 10104, Zona 1000  
San Jose, Costa Rica  
Telephone: (506) 33-233

### El Salvador

Dirección de Recursos Minerales  
Avenida Norte No. 233  
San Salvador, El Salvador

### Guatemala

Ministerio de Energía y Minas  
Diagonal 17, entre 20 y 30 Calles, Zona 11  
Guatemala City, Guatemala  
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### Panama

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TABLE 1  
CENTRAL AMERICA: PRODUCTION OF MINERAL COMMODITIES<sup>1, 2</sup>

(Metric tons unless otherwise specified)

Country and commodity		1999	2000	2001	2002	2003 <sup>e</sup>
BELIZE						
Clays	thousand tons	600	622	557	487 <sup>r</sup>	500
Dolomite		30,000	5,272	4,525	5,500 <sup>r</sup>	5,000
Gold <sup>e</sup>	grams	6,000	7,000	650 <sup>3</sup>	1,000	1,000
Lime <sup>e</sup>		1,250	1,250	1,200	1,200	1,200
Limestone <sup>4</sup>	thousand tons	320 <sup>e</sup>	217	1,140 <sup>r</sup>	355 <sup>r</sup>	400
Marl	cubic meters	1,300 <sup>e</sup>	728	1,143	1,148 <sup>r</sup>	1,140
Sand and gravel <sup>5</sup>	thousand cubic meters	140 <sup>r, e</sup>	150 <sup>r, e</sup>	165 <sup>r</sup>	109 <sup>r</sup>	130
COSTA RICA						
Cement	thousand tons	1,260 <sup>r</sup>	1,050 <sup>r</sup>	1,200 <sup>r</sup>	1,200 <sup>r, e</sup>	1,300
Clays, common <sup>e</sup>		415,000	418,000	420,000	420,000	419,000
Diatomite		18,000 <sup>e</sup>	34,704	26,350	26,400 <sup>e</sup>	26,450 <sup>3</sup>
Gold <sup>e</sup>	kilograms	165	50 <sup>r</sup>	100	100	110
Iron and steel, semimanufactures <sup>e</sup>		80,025 <sup>3</sup>	80,000	80,000	80,000	75,000
Lime <sup>e</sup>		9,800	9,800	9,000	9,900	9,900
Petroleum, refinery products <sup>e, 6</sup>	thousand 42-gallon barrels	5,480	5,500	5,500	5,500	5,450
Pumice <sup>e</sup>		8,000	8,000	8,000	8,000	8,000
Salt, marine <sup>e</sup>		37,000	37,000	37,000	37,000	36,800
Silver	kilograms	112	100	100 <sup>e</sup>	100 <sup>e</sup>	110
Stone, sand and gravel:						
Crushed rock and rough stone	thousand tons	109	201	200 <sup>e</sup>	200 <sup>e</sup>	200
Limestone and calcareous materials	do.	978	905	900 <sup>e</sup>	900 <sup>e</sup>	920
Sand and gravel <sup>e</sup>	do.	1,650	1,650	1,500	1,500	1,550
Sandstone <sup>e</sup>	do.	3,300	3,300	3,300	3,300	3,250
EL SALVADOR						
Aluminum, metal including alloys, semimanufactures <sup>e</sup>		2,650	2,650	2,650	2,650	2,600
Cement, hydraulic		1,031	1,064	1,174	1,318	1,390
Fertilizer materials: <sup>e</sup>						
Phosphatic		13,700	13,600	13,600	13,600	13,600
Other mixed materials		56,500	56,500	56,500	56,500	56,000
Gold	kilograms	71 <sup>e</sup>	--	--	--	--
Gypsum <sup>e</sup>		5,600	5,600	5,600	5,600	5,600
Limestone	thousand tons	1,400 <sup>r</sup>	1,400 <sup>r</sup>	1,425 <sup>r</sup>	1,631 <sup>r</sup>	1,190
Petroleum, refinery products <sup>e, 6</sup>	thousand 42-gallon barrels	6,300	6,300	6,300	6,300	6,300
Salt, marine		33,634 <sup>r</sup>	32,444 <sup>r</sup>	31,610 <sup>r</sup>	31,552 <sup>r</sup>	31,366 <sup>3</sup>
Silver	kilograms	20	--	--	--	--
Steel, semimanufactures		33,501	40,506 <sup>r</sup>	38,502 <sup>r</sup>	48,832 <sup>r</sup>	56,900
GUATEMALA						
Basalt	thousand cubic meters	--	--	243	318	936 <sup>3</sup>
Barite <sup>e</sup>		75	113	700 <sup>r, 3</sup>	100	100
Cement, hydraulic	thousand tons	1,900 <sup>r</sup>	1,960 <sup>r</sup>	2,000 <sup>r</sup>	1,800 <sup>r, e</sup>	1,900
Clays:						
Bentonite		4,301	3,317	3,000 <sup>e</sup>	4,436 <sup>r</sup>	6,438 <sup>3</sup>
Kaolin		61 <sup>e</sup>	77 <sup>e</sup>	227 <sup>r</sup>	372 <sup>r</sup>	1,497 <sup>3</sup>
Unspecified		20,000 <sup>e</sup>	20,000 <sup>e</sup>	73,267 <sup>r</sup>	64,683 <sup>r</sup>	65,000
Feldspar		17,072	17,804	6,809 <sup>r</sup>	11,843 <sup>r</sup>	9,320
Gold	kilograms	4,449	4,500	4,500 <sup>e</sup>	4,500 <sup>e</sup>	4,550
Gypsum		110,173	212,109	96,817 <sup>r</sup>	80,571 <sup>r</sup>	66,981 <sup>3</sup>
Iron and steel:						
Iron ore, gross weight		10,536	16,254	15,000 <sup>e</sup>	35,226 <sup>r</sup>	23,000
Steel, semimanufactures		119,056	166,453 <sup>r</sup>	201,802 <sup>r</sup>	216,108 <sup>r</sup>	226,000
Lead, metal including secondary		115 <sup>e</sup>	57 <sup>r, e</sup>	50 <sup>r</sup>	39 <sup>r</sup>	19 <sup>3</sup>
Lime, hydrated <sup>7</sup>		-- <sup>r</sup>	-- <sup>r</sup>	182 <sup>r, e</sup>	547 <sup>r</sup>	386 <sup>3</sup>
Natural gas, gross	thousand cubic meters	732	622	630 <sup>e</sup>	650 <sup>e</sup>	670

See footnotes at end of table.

TABLE 1--Continued  
CENTRAL AMERICA: PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Country and commodity		1999	2000	2001	2002	2003 <sup>e</sup>
GUATEMALA--Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	8,489	7,571	8,500 <sup>r,e</sup>	9,015 <sup>r</sup>	9,028 <sup>3</sup>
Refinery products <sup>e,6</sup>	do.	7,300 <sup>3</sup>	7,300	7,600	7,600	7,550
Pumice	cubic meters	238,425	261,947	264,322 <sup>r</sup>	377,403 <sup>r</sup>	273,933 <sup>3</sup>
Salt <sup>e</sup>		50,000	50,000	50,000	50,000	60,000
Stone, sand, and gravel:						
Dolomite		23	63	87 <sup>r,e</sup>	24,881 <sup>r</sup>	613 <sup>3</sup>
Limestone	thousand tons	4,396	4,532	2,775	3,040	3,773 <sup>3</sup>
Marble:						
Block	cubic meters	10,222	10,200	15,039 <sup>r</sup>	3,185 <sup>r</sup>	10,000
Chips and pieces		112,290	111,211 <sup>r</sup>	11,448 <sup>r</sup>	99,293 <sup>r</sup>	100,000
Sand and gravel <sup>5</sup>	thousand cubic meters	1,100 <sup>r,e</sup>	1,700 <sup>r,e</sup>	684 <sup>r</sup>	1,066 <sup>r</sup>	711 <sup>3</sup>
Silica sand	thousand tons	116	173	161 <sup>r</sup>	38 <sup>r</sup>	30 <sup>3</sup>
Stone, crushed <sup>e</sup>		50,000	50,000	50,000	50,000	50,000
Talc <sup>e</sup>		--	--	--	568 <sup>r</sup>	1,590
HONDURAS						
Building materials: <sup>e</sup>						
Limestone		985,743 <sup>3</sup>	1,230,478 <sup>3</sup>	1,230,000	1,230,000	1,230,000
Marble	square meters	95,000	95,000	95,000	95,000	90,000
Cadmium, Cd content of lead-zinc concentrates <sup>e</sup>		75	75	75	75	60
Cement	thousand tons	1,200 <sup>r</sup>	1,284 <sup>r</sup>	1,321 <sup>r</sup>	1,360 <sup>r,e</sup>	1,400
Gold	kilograms	879	878	4,574	4,984	5,000
Gypsum		55,848	59,211	59,500	60,000 <sup>e</sup>	60,000
Iron oxide pigments		--	69,969	70,941	71,000 <sup>e</sup>	71,000
Lead, mine output, Pb content		3,764	4,805	6,750	8,128	8,000
Pozzolan		--	186,948	189,999	190,000 <sup>e</sup>	190,000
Rhyolite		--	35,680	32,700	32,700 <sup>e</sup>	33,000
Salt <sup>e</sup>		25,000	25,000	25,000	25,000	26,000
Silver	kilograms	38,153	31,958	46,831	52,877	48,000
Zinc, mine output, Zn content		31,095	31,226	48,485	46,339	46,500
NICARAGUA <sup>8</sup>						
Bentonite		5,280	6,490	6,000 <sup>e</sup>	6,000 <sup>e</sup>	6,300
Cement		570,000 <sup>r</sup>	530,000 <sup>r</sup>	513,793	549,403 <sup>r</sup>	590,000
Gold, mine output, Au content	kilograms	4,448	3,673	3,840 <sup>r</sup>	3,493 <sup>r</sup>	3,029 <sup>3</sup>
Gypsum and anhydrite, crude		26,880	28,170	34,369 <sup>r</sup>	28,153 <sup>r</sup>	30,642 <sup>3</sup>
Lime <sup>e</sup>		58,000	58,000	55,000	56,000	55,000
Limestone: <sup>4</sup>						
For cement		600,000 <sup>r</sup>	702,000 <sup>r</sup>	621,000 <sup>r</sup>	787,000 <sup>r</sup>	789,000 <sup>3</sup>
For other uses		-- <sup>r</sup>	4,540 <sup>r</sup>	8,900 <sup>r</sup>	3,310 <sup>r</sup>	1,600 <sup>3</sup>
Petroleum, refinery products <sup>e,6</sup>	thousand 42-gallon barrels	5,600	5,650	5,650	5,650	5,700
Salt, marine		26,880	16,100 <sup>r</sup>	17,710 <sup>r</sup>	29,710 <sup>r</sup>	31,320 <sup>3</sup>
Sand and gravel <sup>5</sup>	thousand cubic meters	740 <sup>r,e</sup>	970 <sup>r,e</sup>	708 <sup>r</sup>	492 <sup>r</sup>	636
Silver, mine output, Ag content	kilograms	-- <sup>r</sup>	1,589 <sup>r</sup>	2,532 <sup>r</sup>	2,198 <sup>r</sup>	2,040 <sup>3</sup>
Stone, crushed	thousand tons	4,045 <sup>r</sup>	4,689 <sup>r</sup>	5,639 <sup>r</sup>	5,859 <sup>r</sup>	5,400
PANAMA						
Cement		900,000 <sup>r</sup>	950,000 <sup>r</sup>	820,000 <sup>r</sup>	770,000 <sup>r</sup>	770,000
Clays: <sup>e,9</sup>						
For cement	cubic meters	27,000 <sup>r</sup>	165,557 <sup>r,3</sup>	64,246 <sup>r,3</sup>	64,000 <sup>r</sup>	64,000
For products	do.	4,400 <sup>r</sup>	4,300 <sup>r</sup>	4,300 <sup>r</sup>	4,300 <sup>r</sup>	4,300
Gold <sup>e</sup>	kilograms	1,500	-- <sup>r,3</sup>	-- <sup>r,3</sup>	-- <sup>r</sup>	--
Lime <sup>e</sup>		3,500	3,500	3,500	3,500	3,500
Petroleum, refinery products <sup>e,6</sup>	thousand 42-gallon barrels	10,000	10,000	--	--	--
Salt, marine <sup>e</sup>		22,500	22,500	22,500	22,500	23,000
Silver <sup>e</sup>	kilograms	2,000	-- <sup>r,3</sup>	-- <sup>r,3</sup>	-- <sup>r</sup>	--

See footnotes at end of table.

TABLE 1--Continued  
CENTRAL AMERICA: PRODUCTION OF MINERAL COMMODITIES<sup>1,2</sup>

(Metric tons unless otherwise specified)

Country and commodity	1999	2000	2001	2002	2003 <sup>e</sup>
PANAMA--Continued					
Stone, sand and gravel: <sup>e</sup>					
Limestone <sup>4</sup>	275,000	939,000 <sup>r, 3</sup>	469,000 <sup>r, 3</sup>	270,000	270,000
Sand and gravel <sup>5</sup> thousand cubic meters	1,200	1,997 <sup>r, 3</sup>	441 <sup>r, 3</sup>	1,200	1,200

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through April 2004.

<sup>2</sup>In addition to the commodities listed, some additional construction materials (clays, gravel, miscellaneous rock, sand, and weathered tuffs) were presumably produced to meet domestic needs. Available information is inadequate to make reliable estimates of output levels.

<sup>3</sup>Reported figure.

<sup>4</sup>Some figures that were reported or estimated as a volumetric measure (cubic meters) were converted to a weight measure equivalent (metric tons) by multiplying by an average density of 2.72 for limestone.

<sup>5</sup>Some figures that were reported or estimated as a weight measure (metric tons) were converted to a volumetric measure equivalent (cubic meters) by dividing by an average density of 2.5 for sand and gravel (mixed) to compare with figures reported in cubic meters.

<sup>6</sup>Includes aviation and motor gasoline, diesel, distillate fuel oil, kerosene, and liquefied petroleum gas.

<sup>7</sup>Reported figures for production of lime as a separate commodity in Guatemala were not received prior to 2001.

<sup>8</sup>In addition to the commodities listed, Nicaragua produced a variety of industrial minerals to meet domestic needs. Output of these materials was not reported, and available information is inadequate to make reliable estimates of output levels.

<sup>9</sup>Figures that were previously estimated in metric tons were converted to a volumetric equivalent (cubic meters) by dividing by an average density of 1.7 for clay (compacted) to compare with the two figures for 2000 and 2001 reported in cubic meters.